Performance evaluation of production structures in agricultural holdings – case study

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PERFORMANCE EVALUATION OF PRODUCTION STRUCTURES IN AGRICULTURAL HOLDINGS – case study

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Abstract: *The performance of production structures in agriculture is determined by a complex of factors, the most important are: the natural potential of agricultural holdings, financial resources necessary to purchase inputs, ensuring balance in the allocation of factors of production, technical and technological potential, the existing workforce and the readiness of the farm manager. Based on these considerations we want in this paper to analyze the aspectes defining application of performance management in order to develop sustainable production structures, increase competitiveness of farms, farmers' income stabilization and Romanian rural development.*

Keywords: *production structure, management, efficiency, competitiveness*

INTRODUCTION

Romanian agriculture is no homogeneous in terms of farming structures and their dual nature is emphasized compared to the vast majority of Member States of the European Union. Although some progress has been made, an excessive number of individual, small and very small, underperforming farms are maintained, as a small number of large and very large units whose activity was not restructured to become compatible with the requirements of unique market.

Small farms are generally undercapitalized, fails to provide a high degree of mechanization technologies, growers focusing mainly on crop management methods by manual means. The labour force is represented by family members and some times of staff used to meet temporary needs works in the best moments.

To reduce the number of subsistence and semi-subsistence farms and formation of the medium sized commercial farms sector, suitable structural policy measures are needed, simultaneous with the reform of land ownership.

In the period 2002-2010, the structures operating in Romania's agriculture had some developments, but poor in adapting to the requirements of the Community market and for the better use of resources that Romania has.

According to results of the General Agricultural Census 2010, the number of agricultural holdings in Romania was 3,856 thousand, of which 3,825 thousand unincorporated farms, with 14.3% lower than in 2002 and 31 thousand holdings with legal personality, increased by 34.8% compared to 2002. Reducing the number of farms was due mainly to merging of unincorporated farms.

The changes in the structure of agricultural holdings in the period 2002 - 2010, are shown in the data from Table 1.

In Romania the small subsistence farms proved very durable. Structural changes should lead to the multifunctional development of these households, their association for the marketing of products, supply inputs, common investments and agricultural works, product storage, processing of raw materials, etc. Gradually, the number of subsistence farms will decrease in favour of forming a viable commercial sector and rural economic diversification in Romanian rural space.

The existence of diversified farming structures linked by various forms of cooperation and agro-industrial integration that are competitive on the unique and world market is the fundamental option for Romania.

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Table 1. The main indicators at national level, by legal status of Farms, in the period 2002-2010

Indicators	Year	MU	Total farms	Unincorporated farms	Farms with legal personality
Farms	2002	Thousands	4485	4462	23
	2005	Thousands	4256	4238	18
	2007	Thousands	3931	3914	17
	2010	Thousands	3856	3825	31
The total area	2002	thousand ha	15708	8454	7254
	2005	thousand ha	15442	9886	5556
	2007	thousand ha	15265	9591	5674
	2010	thousand ha	15867	8488	7379
The used agricultural area (UAA)	2002	thousand ha	13931	7709	6222
	2005	thousand ha	13907	9102	4805
	2007	thousand ha	13753	8966	4787
	2010	thousand ha	13298	7445	5853
Average agricultural area utilized on farm	2002	Ha	3.11	1.73	274.43
	2005	Ha	3.27	2.15	263.08
	2007	Ha	3.50	2.29	270.45
	2010	Ha	3.45	1.95	190.84

Source: General Agricultural Census 2010, NIS 2011

The commercial agricultural units sector to produce for the market and integrate into the structures and community norms should include most of the agricultural area of the country, merged in surfaces with economic dimensions, operated at least in the following types of economic organization: individual farms (family); family agricultural unincorporated associations; freelancers; groups of producers with legal personality that develop association or cooperative forms on the product chain; agricultural cooperatives organized, especially in the upstream and downstream of agriculture; agricultural companies; private agricultural companies etc.

The commercial agricultural units sector should include both medium and large businesses, as well as a part of small households in hilly and mountainous areas and surrounding cities. The latter should be encouraged to develop as forms of organization that provide diversification of rural economy by using local resources and available labour within the family, as well as those engaged in other activities (commuters or with urban residence that have households in rural areas).

The commercial family farms can form as a result of measures to support semi-subsistence farms and strengthen the existing family farms producing for the market, by facilitating the access to EU structural funds.

MATERIAL AND METHOD

To capture best the opportunities for developing and enhancing the performance of agricultural activities, it was conducted a research at farm level from the plain area.

The research objectives were to identify the ways to use the land, human, material and financial resources in agricultural units and economic performance of their work.

The research methodology consisted of a documentation study conducted using a questionnaire survey. The sources of information have been domestic farm records.

The method of data collection is the survey. As investigation technique, was used structured questionnaire-based investigation by direct interview. The questionnaire included questions on different aspects of the farm business: agricultural area, its structure by use; level of technical equipment of the holding; human resources used and structure; structure of agricultural production

of vegetable origin; livestock; average and total yields; commodity production and market policy; costs, prices and profitability of products sold; costs per hectare and per animal; income and economic outcomes.

RESULTS AND DISCUSSION

When selecting the participants for study documentation was considered both farm profiles: cereal, vegetable, wine, livestock and so on as well as their territorial spread and the legal status of holdings (individual husbandries, family associations, agricultural societies).

The analysis of data collected from the survey was their critical analysis: analyze, evaluate, explain, inference and interpretation. In addition, temporal comparison was used to capture the changes in economic performance in 2009-2011, due to the market (price changes) and to management decisions on crop structure, human resources utilization, allocation of production factors, market policy, etc.

For example we have chosen a case study of a farm type family agricultural association.

Family Association has a mixed profile, in the revenue predominantly oilseed crops, although in the area cultivated the shares held by them and cereals are close.

Table 2. The land use mode

Specification	**Total hectares**	**of which:**		**% Arable from agricultural**
		Property	**Lease**	
Agricultural area, of which:	482	482	-	x
- Arable	482	482	-	100.0

Conclusions:

- association has a significant agricultural area, if we consider the excessive fragmentation of land holdings in Romanian agriculture;
- entire area is found in the form of arable land (one category of use);
- crop structure mentioned above is natural, being recognized arable land suitability for cereals, oilseeds and other field crops

Table 3. Technical facilities owned by the association

Type	**2009**	**2010**	**2011**
- Tractor U650	3	3	3
- Plows	3	3	3
- Disc harrows	2	2	2
- Seeders for straw cereals	1	1	1
- Seeders for row plants	1	1	1
- Transport trailers	2	2	2
Average agricultural area per tractor is 160 ha			

Conclusions:

- existing technical means are formed mainly of those necessary for the soil basic works and for crop sowing;
- load on the tractor is 160 hectares, which exceeds its level found in countries with developed agriculture, and the one in our country;
- the combines for harvesting grain and oilseeds are not found among technical means, which, in case of failure in relationships with service providers, delays may occur in carrying out this work

Table 4. Dynamics of income, expenses and financial results

Specification	2009		2010		2011	
	Ron	%	Ron	%	Ron	%
Total revenue, of which:	**619 347**	**100.0**	**670 105**	**108.2**	**657 495**	**106.2**
Income from operations	588 380	100.0	636 600	108.2	624 620	106.2
Subsidies	18580	100.0	20103	108.2	19725	106.2
Other income	12387	100.0	13402	108.2	13150	106.2
Total expenses, of which:	**543 953**	**100.0**	**556 660**	**102.3**	**558 421**	**102.7**
Operating expenses	512 236	100.0	524 202	108.3	525 852	102.7
Profit before tax	**75394**	**100.0**	**113 445**	**150.5**	**99 083**	**131.4**
Net profit	**63 330**	**100.0**	**95 294**	**150.5**	**83230**	**131.4**

Conclusions:

- the economic activity has been profitable, which is the ultimate goal of any lucrative endeavour;
- positive correlation between income and expenditures, the latter knowing slower growth;
- increasing profit trend as a result of the above-mentioned correlation;
- low level of profitability (gross profit / operating expenses), showing that there are possibilities for a better exploitation of the existing production conditions

Table 5. Crop structure

Specification	2009		2010		2011	
	ha	%	ha	%	ha	%
Grain-total, of which:	245	50.8	258	53.5	236	49.0
Wheat	94	19.5	99	20.5	89	18.5
Corn	68	14.1	80	16.6	71	14.7
Barley	83	17.2	79	16.4	76	15.8
Oilseed crops-total, of which:	237	49.2	224	46.5	246	51.0
Sunflower	89	18.5	95	19.7	101	21.0
Rape	148	30.7	129	26.8	145	30.0
TOTAL	482	100.0	482	100.0	482	100.0

Conclusions:

- the crop structure contains field crops, wheat and maize being traditional crops of Romanian agriculture;
- almost half of the area cultivated remains to oilseeds crops: sunflower and rapeseed;
- the share of the two crops is determined by the demand for them, in order to obtain oil for human consumption and in the case of rape, the production of biodiesel;
- sunflower with a rate around 20% of the cultivated area will not come back after itself in less than five years, which is well, knowing the fact that this crop is a big consumer of nutrients from the soil

The average yield determines, according to its level and to correlation with the size of production costs per hectare, the production and economic results of farm. Therefore, there is interest to give it an ascending trend.

Table 6. Evolution of average productions

Specification	2009		2010		2011	
	kg / ha	%	kg / ha	%	kg / ha	%
Wheat	2809	100.0	3470	123.5	3295	117.3
Corn	3318	100.0	3650	110.0	3547	106.9
Barley	3107	100.0	3580	115.2	3340	107.5
Sunflower	1370	100.0	1530	116.7	1453	106.0
Rape	1520	100.0	1786	117.5	1630	107.2

Conclusions:

- Average yields have increased for all cultures, compared to 2009;
- in the given circumstances, the average crop production can be considered as satisfactory;
- the size of the average production much depends on natural rainfall;
- the fact there are no irrigation, makes no other production factors are boosted, decreasing their impact on average yields;
- compliance with all technological phases is, as known, a condition that determines the size of the average production

Table 7. Evolution of total and commodity production

Specification	2009		2010		2011	
	TP (t)	CP (t)	TP (t)	CP (t)	TP (t)	CP (t)
Wheat	264	148	344	193	293	193
Corn	226	132	292	160	252	157
Barley	258	235	283	244	254	219
Sunflower	122	122	145	145	147	147
Rape	225	225	230	230	236	236

TP - total production

CP - commodity production

Conclusions:

- total production follows the trend of the average production per hectare of each crop;
- trend of increasing total productions is accompanied by annual variations of their levels, with consequences on the size of income;
- in the case of cereals, commodity production has a certain percentage of the total, while at oilseed crops was capitalized everything was obtained as a consequence of these products specific, which enter in processing activities, being found in the form of raw materials for different industries.

Table 8. Dynamics of costs, prices and profitability of products

Specification	UM	2009	2010	2011
Wheat				
- Quantity of commodity	t	148	193	193
- Cost per t	lei	490	455	470
- Price per t	lei	480	500	520
- Profit / loss	lei / t	10	45	50
- Subsidies	lei / t			

Corn				
- Quantity of commodity	t	132	160	157
- Cost per t	lei	340	320	332
- Price per t	lei	350	360	390
- Profit / loss	lei / t	10	40	58
- Subsidies	lei / t			
Barley				
- Quantity of commodity	t	235	244	219
- Cost per t	lei	480	430	455
- Price per t	lei	500	500	520
- Profit / loss	lei / t	20	70	65
- Subsidies	lei / t			
Sunflower				
- Quantity of commodity	t	122	145	147
- Cost per t	lei	850	835	840
- Price per t	lei	870	900	850
- Profit / loss	lei / t	20	65	10
- Subsidies	lei / t			
Rape				
- Quantity of commodity	t	225	230	236
- Cost per t	lei	960	935	948
- Price per t	lei	1100	1000	950
- Profit / loss	lei / t	140	65	2
- Subsidies	lei / t			

Conclusions:

- looked on the whole crops, the profitability experienced in the period a significant increase;
- exception to the situation mentioned above, are sunflower and, especially, rapeseed (sharp decline in profit per ton, approaching an equality between its selling price and the cost per ton of product);
- sale prices are relatively stable, registering, however, some small deviations from one year to another, causing, together with the volume of output, some variation of incomes;
- costs per ton of product have a slight downward trend, which is positive, could appreciate that there was a good management of inputs allocated

Table 9. Staff structure

Specification		**2009**	**2010**	**2011**
Total staff, of which:	TESA	1	1	1
	Workers		3	3
Higher education personnel	Technical Studies	1	1	1
	Economic studies	-	-	-
Staff with secondary studies	Technical Studies	3	3	3
	Economic studies	1	1	1
Total workers	Machine operators	3	3	4
	Daily labourers	11	12	12

Conclusions:

- the staff of association remained almost constant numerically;
- technical higher education holds a single person;
- there is no superior economic trained staff, given this kind problems and importance of market relations

Table 10. Labour productivity

Specification	UM	2009	2010	2011
Income from operations	Ron	588 380	636 600	624 620
	%	100.0	108.2	106.2
Permanent staff	No.	10	10	11
Income per person with permanent activity	Ron	58 838	63 660	56 784
	%	100.0	108.2	96.5

Conclusions:

- staffing is nearly constant, the productivity experienced the same trend as that of income;
- tendency seems to be to reduce productivity;
- allure of productivity growth is driven by changes in current prices as physical quantities of products sold have a more moderate reduction trend

Commodity production

The association induces the products obtained in economic flows (some only partially). Here comes, with important role, the marketing policy (increased demand, offer, negotiation, compliance with the quality requirements, etc.). This step concludes the cycle of activity, putting his mark on the final results, if we only think about the prices at which the products are marketed.

Table 11. Evolution of commodity production

Product	MU	2009		2010		2011	
		quantities / amounts	%	quantities / amounts	%	quantities / amounts	%
Wheat	t	148	100.0	193	130.4	193	130.4
	ron	71040	100.0	96500	135.8	100360	141.3
Corn	t	132	100.0	160	121.2	157	118.9
	ron	46200	100.0	57600	124.7	61230	132.5
Barley	t	235	100.0	224	95.3	219	93.2
	ron	117500	100.0	122000	103.8	113 880	96.9
Sun flower	t	122	100.0	145	118.8	147	120.5
	ron	106140	100.0	130500	123.0	124 950	113.7
Rape	t	225	100.0	230	102.2	236	104.9
	ron	247500	100.0	230000	92.9	224200	90.6

Conclusions:

- there is a link between the two productions, which appears differently depending on the physical commodity production trend, and the "movement" of prices;
- prices determined that value of commodity production to increase or reduce faster than physical commodity production;
- when prices fell sharply (such as rape), although physical commodity production increased, however, could not compensate for the severe reduction in the selling price

Table 12. Dynamics of average selling prices

Product	UM	2009	2010	2011
Wheat	lei	0.48	0.50	0.52
	%	100.0	4.2	8.3
Corn	lei	0.35	0.36	0.39
	%	100.0	2.8	11.4
Barley	lei	0.50	0.50	0.52
	%	100.0	100.0	4.0
Sunflower	lei	0.87	0.90	0.85
	%	100.0	3.4	-2.3
Rape	lei	1.10	1.00	0.95
	%	100.0	-9.1	-13.7

Conclusions:

- Prices have not seen big changes, except rape culture;
- price fluctuations have had an impact, as shown, on the value of commodity production and, of course, on income from operations;
- pricing policy should be considered in marketing activities that will take place in the unit

CONCLUSIONS

The analysis of agricultural holdings economic activities ended with conclusions and recommendations in the form of SWOT analysis, in which have been captured main strengths and weaknesses of agricultural units, the opportunities they can capitalize on and threats in the environment they are exposed to.

The relevance of the research is to create the necessary conditions to further design of optimal farm size and crop structure.

Strengths

- conduct every year activities in profitability conditions;
- positive correlation between income and expenditures, the first having a faster growth, with positive consequences on the dynamics of profit;
- the fact that the association has a large area of arable land, having real possibilities of organizing crop rotation;
- a relatively diversified production structure, which contributes to the achievement of objective from the preceding paragraph;
- the use of technologies based on capital allocations, which can lead to increased productivity of the production system practiced in the association;

Weaknesses

- low profitability, it has a less favourable influence on the development policy of the association;
- variations in time of the yields per hectare, with implications for the size and stability of income;
- reduced profitability of some crops, which have a negative influence on all its degree of activity;
- technical equipment appears to be insufficient in relation to the area and the crop activities of the production structure;
- lack of staff with higher economic studies;

- high level of arable land per tractor, which adversely affect the optimal time to perform the land works;
- in technical equipment is not found a grain and oilseeds harvester.

Opportunities

- expansion of the market (market share);
- demand to the diversification of the production (other crops);
- increasing accessibility to inputs (their price level);
- increasing export opportunities;
- improve the quality of inputs, with positive influence on yield per hectare;
- technical means more efficient, resulting in a higher yield and better quality of the work

Threats

- Appearance in the crisis conditions, of financial difficulties of the customers (distribution companies, processors etc.);
- declining purchasing power of the population and therefore a reduction in demand for products that are made from some grains and oilseeds by processing;
- lower selling prices due to the occurrence and other competitors and increase supply;
- pressures, by price, of the imported goods

REFERENCES

1. Davidovic, I. *Decision making and economic performance in farms, Ed IRLI, Bucharest, 2002*
2. Iuliana Dobre, R. Voicu, Bran Mariana - The Phenomenon of diversifying the production structure and Its economic, social and ecological Journal Quality - access to success, Year 12, no, 121, 2011
3. Rethore, A, Riquiter, D. - Farm management, French edition, 1998.
4. Voicu R., Turek Rahoveanu A., Ion Raluca - The structure of production in Romanian agriculture - the gap between the EU 27, Economics of Agriculture, Special Issue -2, I Book, 2010, p 366-374
5. Voicu, R., Iuliana Dobre, Mariana Bran - The management and economic performance of the production system from the agricultural exploitations, Metallurgy International, no. 2/2008
6. Voicu, R., Dobre, Iuliana - Organization and strategy development of agricultural organizations, ASE Publishing House, Bucharest, 2003
7. Zahiu, Letitia - Agricultural Management, Economic Publishing House, Bucharest, 1999
8. PNDI, Contract no. 52126/2008 - Improving the management of production structures in developing South-Muntenia region in order to increase the competitiveness of farms.